Eye health in Australia

A hospital perspective

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Contents

Acknowledgments

Abbreviations

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
AIHW	Australian Institute of Health and Welfare
ALOS	average length of stay
AR-DRG	Australian Refined Diagnosis Related Group
ASGC	Australian Standard Geographical Classification
CC	complication and/or comorbidity
DRG	Diagnosis Related Group
ICD-10	International Statistical Classification of Diseases and Related Health Problems, 10th revision
ICD-10-AM	International Statistical Classification of Diseases and Related Health Problems, 10th revision, Australian Modification
MDC	Major Diagnostic Category
NonOR	non-operating room
NSW	New South Wales
NT	Northern Territory
OR	operating room
Qld	Queensland
SA	South Australia
Tas	Tasmania
Vic	Victoria
WA	Western Australia
WHO	World Health Organization

Summary

Eye health in Australia: a hospital perspective is the first in a series of national reports providing an overview of eye health in Australia. This report contains hospital data and some related trends data for the period 2001–02 to 2005–06.

Some of the main findings in this report are given below.

Key findings

- Eye problems accounted for about 1 in 30 hospitalisations (nearly 250,000) in 2005–06.
- Around 70% of these hospitalisations were for lens procedures (mostly cataract removal), and most of these were same-day procedures.
- The rate of hospitalisations for eye problems rose marginally over the period 2001–02 to 2005–06.
- The public hospitals total cost for diseases and disorders of the eye in 2005–06 was nearly $233 million. A comparable cost for private hospitals could not be calculated, but is estimated to be about $220 million.
- The rate of hospitalisations for eye problems among Aboriginal and Torres Strait Islander peoples was similar to the total Australian population. However, hospitalisation rates for cataract were lower among Indigenous Australians, whereas eye-related injuries were higher.
- The median waiting time for ophthalmology elective surgery in the public hospital system was 69 days, the longest of any speciality. The median waiting time increased, on average, by 3 days per year between 2000–01 and 2005–06.

Introduction

The World Health Organization (WHO) estimated that over 161 million people are visually impaired worldwide (Resnikoff et al. 2004). An Australian analysis (AIHW 2005a) estimated that just over 9% of Australians aged 55 or older are visually impaired (this excludes corrected refractive error) and about 1.2% are blind. Given the strong relationship between age and vision loss, and the general ageing of the population, vision impairment is set to become a greater problem in Australia.

Self-reported data on the prevalence of vision loss are available through the Australian Bureau of Statistics (ABS) National Health Survey 2004–05. The survey indicates that about half (52%) of the Australian population have eyesight problems, including long- and short-sightedness, as a long-term medical condition (ABS 2006). An analysis by Taylor et al. (2005) estimated that nearly half a million Australians had low vision in 2004, including more than 50,000 with blindness. The most common causes of low vision were under-corrected refractive error (62%), cataract (14%) and age-related macular degeneration (10%).

This report investigates hospitalisations due to eye problems in Australia for the 2005–06 financial year and the preceding 4 years. Hospital data will not mirror the prevalence findings mentioned previously: cataracts are typically dealt with in a hospital setting but under-corrected refractive error and age-related macular degeneration are not typically managed in hospitals.

Hospital data are collected for each separation, which begins when a patient is admitted to hospital and ends when the total hospital stay ends (for example, the patient is discharged or dies) or there is a change to the type of care (for example, from acute to rehabilitation).

There are three ways of classifying hospital separations: diagnoses, procedures and Australian Refined Diagnosis Related Groups (AR-DRGs). AR-DRGs are a means of classifying episodes into diagnostically meaningful groups of episodes that have similar costs. This report uses the AR-DRG approach, and presents analysis of hospital separations with a Major Diagnostic Category (MDC) of MDC 02, Diseases and disorders of the eye, and waiting times data for the surgical specialty of ophthalmology.

Structure of the report

This report has four major components:
- an introduction
- a results section with selected summary tables and figures
- appendixes comprising methods, data sources and detailed statistical tables
- glossary and reference sections.

The first and second parts of the results section provide data and comments on hospital separations for eye diseases and disorders, focusing on trends, diagnosis and procedures, costs, regional variations and selected populations. Data are sourced from the National Hospital Morbidity Database.

The third part of the results section deals with waiting times for ophthalmology surgery. Data are sourced from National Elective Surgery Waiting Times Data Collection.

Appendix 1 includes descriptions of the National Hospital Morbidity Database and the National Elective Surgery Waiting Times Data Collection, the population estimates used in this report, and a section on the age standardisation methods used.

Appendix 2 includes additional tables considered too detailed for the results section.

Context of the report

In response to the World Health Assembly resolution WHA56.26 on the elimination of avoidable blindness in member states, the Australian Health Ministers' Conference endorsed the *National framework for action to promote eye health and prevent avoidable blindness and vision loss* (the *National eye health framework*). The *National eye health framework* focuses on eliminating avoidable blindness and vision loss in Australia, providing an outline for nationally coordinated action by governments, health professionals, non-government organisations, industry and individuals to work in partnership (Commonwealth of Australia 2005).

In the 2006 Federal Budget, the Australian Government allocated $13.8 million over 4 years to a new National Eye Health Initiative. This initiative supports a range of activities to raise public awareness of eye health issues and to strengthen the delivery of eye health care.

The Australian Government Department of Health and Ageing commissioned the AIHW through the National Eye Health Initiative to do this report. This follows on from work done for earlier publications, *Vision problems among older Australians*, released in July 2005, and *A guide to Australian eye health data*, released in May 2007.

The key areas for action within the *National eye health framework* provide a brief outline of the challenges to be tackled and a series of actions that might be used to meet these challenges.

The Key area for action 5—*Improving the evidence base* outlines, among other actions, a need to look at existing health data sets for relevance to eye health. This report informs this action area by compiling statistics on hospital separations for eye diseases and disorders.

This report is the first in a series of national reports providing an overview of eye health in Australia.

Hospitalisations

Trends in hospitalisations for eye diseases and disorders, 2001–02 to 2005–06

In 2005–06, there were nearly 248,000 hospital separations for diseases and disorders of the eye. This accounted for 3.4% of all hospital separations for that year (Table 1).

Over the period 2001–02 to 2005–06, the number of eye-related separations steadily rose, with the number per 1,000 people increasing marginally. Lens procedures, which account for nearly 70% of all procedures, were mostly responsible for the increase.

Table 1: Trends in separations for diseases and disorders of the eye, 2001–02 to 2005–06

Measure	2001–02	2002–03	2003–04	2004–05	2005–06
All separations for diseases and disorders of the eye					
Number of separations	206,090	217,950	223,237	239,307	247,944
Percentage of all separations	3.2	3.3	3.3	3.4	3.4
Separation rate (per 1,000 population[a])	10.5	10.9	10.9	11.5	11.6
All separations for lens procedures[b]					
Number of separations	138,848	148,752	153,209	166,944	172,224
Percentage of all separations	2.2	2.2	2.2	2.4	2.4
Separation rate (per 1,000 population[a])	7.1	7.4	7.5	8.0	8.0
Percentage of all diseases and disorders of the eye separations	67.3	68.3	68.6	69.8	69.5

(a)   Directly age-standardised to the 2001 Australian population.

(b)   Includes same-day and not same-day procedures (AR-DRG C16A and C16B).

Source: AIHW National Hospital Morbidity Database.

Hospitalisations in 2005–06

Hospital separation rates rose with age up to 84 years—with a rapid increase from age 65—then declined for persons aged 85 years and over (Figure 1). Male and female rates were similar, although females had higher rates between the ages of 60 and 79 years.

Among children and young adults, those aged 0–4 years had a slightly higher rate than other children, while older children's and young adults' rates were consistently low. There were around 7,900 separations for children aged 0–12 years, representing 3.2% of all eye disease and disorder hospital separations. Children had a lower proportion of separations for lens disorders compared with adults, and a higher

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proportion of separations for disorders related to refractive error, as well as disorders of the eyelid, lacrimal system (tear ducts) and orbit (eye socket).

Separations per 100,000 population

Source: AIHW National Hospital Morbidity Database.

Figure 1: Separations for eye diseases and disorders, by age and sex, 2005–06
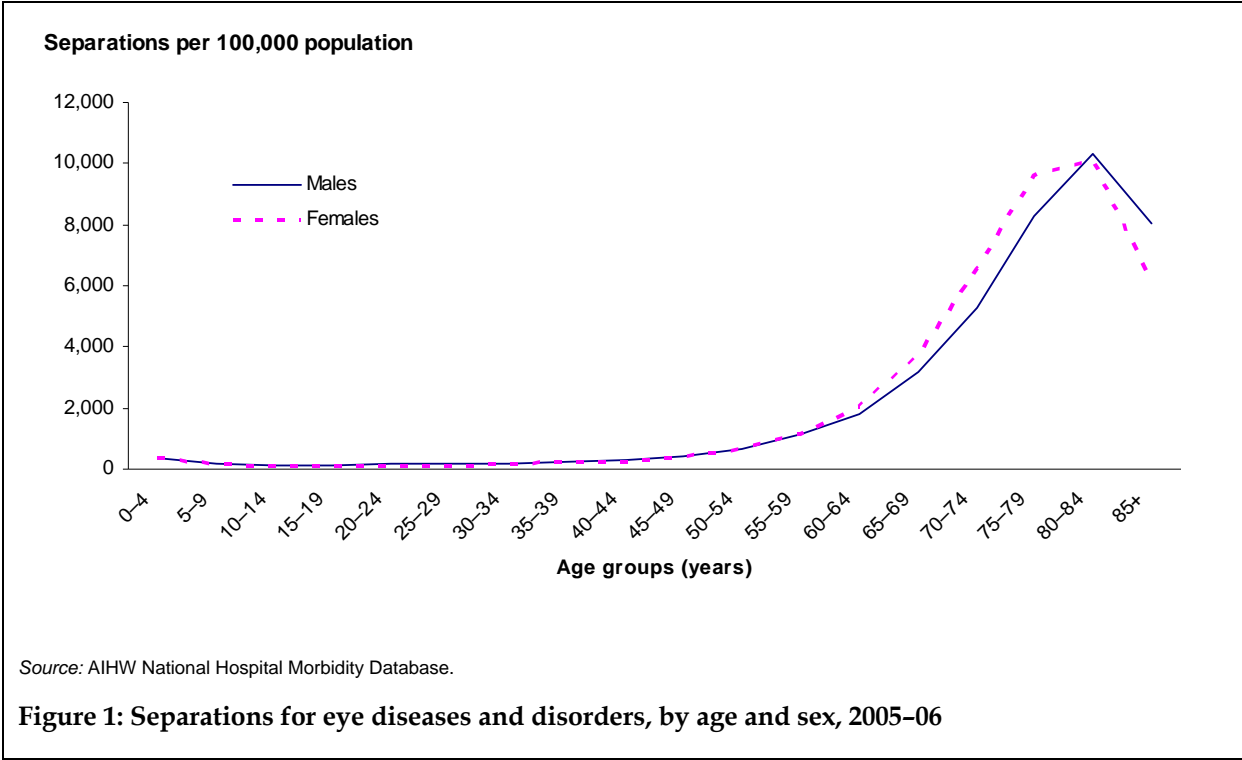
A little over 5% of all separations were for medical reasons as opposed to surgical reasons (Tables 2, A2.5). This partition is not consistent across all age groups, with medical separations among those aged under 25 years accounting for about one-third of all separations. The older age groups, which dominated the number of eye separations, had a very low proportion of medical separations.

Most hospitalisations took less than a day, although the average length of stay (ALOS) for medical purposes was 2.4 days.

Table 2: Eye diseases and disorders hospital separations, by surgical/medical partition and sex, 2005–06

Measure	Surgical			Medical		
	Males	**Females**	**Persons**	**Males**	**Females**	**Persons**
Separations	103,601	131,529	235,130	6,992	5,822	12,814
Patient days	113,032	139,435	252,467	15,388	14,950	30,338
ALOS (days)	1.1	1.1	1.1	2.2	2.6	2.4
	Excluding same-day separations					
Patient days	19,995	21,328	41,323	11,547	11,882	23,429
ALOS (days)	1.9	1.6	1.7	3.7	4.3	4.0

Source: AIHW National Hospital Morbidity Database.

Nearly 70% of all eye diseases and disorders hospital separations were for lens procedures, and most of these were same-day procedures (Table 3). Other AR-DRGs had many fewer separations. Only two medical conditions appeared in the top 10 list—'other disorders of the eye, without complications' and 'hyphema and medically managed trauma to the eye'.

Table 3: Leading AR-DRGs for eye diseases and disorders, 2005–06

Rank	AR-DRG description	AR-DRG code[a]	Number	Per cent of total
1	Lens procedures, same-day	C16B	161,497	65.1
2	Eyelid procedures	C11Z	15,125	6.1
3	Retinal procedures	C03Z	12,562	5.1
4	Lens procedures, not same-day	C16A	10,727	4.3
5	Other eye procedures	C14Z	9,517	3.8
6	Other corneal, scleral and conjunctival procedures	C12Z	8,244	3.3
7	Other disorders of the eye, without complication	C63B	4,719	1.9
8	Hyphema and medically managed trauma to the eye	C62Z	4,282	1.7
9	Glaucoma and complex cataract procedures, same-day	C15B	3,809	1.5
10	Major corneal, scleral and conjunctival procedures	C04Z	3,475	1.4
	All AR-DRGs for eye diseases and disorders		**247,944**	**100.0**

(a)   Version 5.0.

Source: AIHW National Hospital Morbidity Database.

Cataract was the leading principal diagnosis for eye diseases and disorders, accounting for 60% of all separations (Table 4). A cataract is when the lens of the eye clouds, preventing light from entering the eye and leading to vision loss. This figure does not tell the whole story, however, as it does not include diabetes-related cataracts assigned to the principal diagnosis of diabetes (see below). The diagnosis of 'other cataract' includes all types of cataract not classified as senile cataract, such as congenital, juvenile, traumatic and drug-induced cataract. However, 99% of separations for this diagnosis were for 'cataract, unspecified', and may include senile cataracts (degenerative cataracts, and those which are not congenital or caused by trauma) that were not specified as such. More detail is needed to fully understand the incidence of different types of cataract.

Diabetes is a risk factor for a variety of eye diseases and disorders, especially diabetic retinopathy (retinal disease), cataracts and glaucoma. Those with diabetes are 1.3 times as likely as non-diabetic persons to be blind or have visual disturbances (AIHW 2008). Of the 26,000 separations for eye diseases and disorders where the principal diagnosis was diabetes, around 1,400 (5.5%) separations were for diabetic retinopathy, while around 23,400 (90.1%) separations were for diabetes with another specified ophthalmic complication. This latter diagnosis includes diabetes mellitus with early onset age-related cataract.

Macular degeneration is included in retinal disorders, which was the fifth most common diagnosis for eye disease and disorder separations (Table 4). Macular degeneration involves degenerative processes in the part of the retina known as the macula, which allows a person to see fine details. Degeneration in this area of the eye initially affects central vision. Because of an ageing population, and the fact that it is often difficult to treat, macular degeneration is the most common cause of blindness in Australia (Macular Degeneration Foundation 2008). In 2005–06, macular degeneration was the principal diagnosis for nearly 2,900 eye disease and disorder separations; it was also diagnosed (as a non-principal diagnosis) in nearly 4,300 other hospital separations. Macular degeneration was the most common cause for all retinal disorders within eye diseases and disorders, accounting for 31% of retinal disorder separations. Other important retinal disorders included serious retinal detachment (19% of retinal disorder separations) and retinal detachment (24%).

Injuries of the head was the other principal diagnosis not directly related to the eye, yet still making up a substantial proportion of eye disease and disorder separations, accounting for nearly 2% of all separations.

Table 4: Leading principal diagnosis separations for eye diseases and disorders, 2005–06

Rank	Principal diagnosis	ICD-10-AM[a]	Number	Per cent of total
1	Other cataract	H26	113,166	45.6
2	Senile cataract	H25	36,393	14.7
3	Diabetes	E10-E14	26,003	10.5
4	Disorders of eyelid, lacrimal system and orbit	H00-H06	19,058	7.7
5	Retinal disorders	H33-H36	9,266	3.7
6	Disorders of conjunctiva	H10-H13	7,498	3.0
7	Disorders of ocular muscles, binocular movement, accommodation and refraction	H49-H52	7,333	3.0
8	Malignant neoplasm of skin of eyelid	C441	5,969	2.4
9	Injuries to the head	S00-S09	4,735	1.9
10	Glaucoma	H40	3,020	1.2
	All separations for eye diseases and disorders		**247,944**	**100.0**

(a)   Fourth edition.

Source: AIHW National Hospital Morbidity Database.

Apart from anaesthesia, which accounted for 47.4% of eye disease and disorder procedures, the most common procedure was extracapsular crystalline lens extraction by phacoemulsification (breaking up the diseased lens by ultrasound and removing the lens pieces through a very small incision) (Table 5). This reflects the fact that cataract diagnoses were associated with the most eye disease and disorder separations.

Corrective laser procedures are not among the leading hospital procedures for eye diseases and disorders. This is partly because many laser-assisted in situ keratomileusis (LASIK) and photorefractive keratoplasty procedures are not eligible

for funding through Medicare. Approximately 2,800 LASIK and photorefractive keratoplasty procedures for eye diseases and disorders were performed in public and private hospitals in 2005–06. The overall number of such procedures, including those performed in private laser surgery clinics, is not available for Australia.

Table 5: Leading procedures for eye diseases and disorders, 2005–06

Rank	Procedure	ICD-10-AM[a]	Number	Per cent of total
1	Cerebral anaesthesia (general anaesthesia)	1910	180,919	30.9
2	Extracapsular crystalline lens extraction by phacoemulsification	197	165,397	28.2
3	Conduction anaesthesia (local anaesthesia)	1909	96,791	16.5
4	Excision of lesion of skin and subcutaneous tissue	1620	11,389	1.9
5	Vitrectomy	207	8,108	1.4
6	Excision, eyelid	1662	7,308	1.2
7	Other excision procedures on cornea	172	7,277	1.2
8	Repair of retinal detachment	212	6,792	1.2
9	Repair procedures on conjunctiva	255	6,114	1.0
10	Procedures for ectropion or entropion	239	5,728	1.0
	All procedures for eye diseases and disorders		**586,152**	**100.0**

(a) Fourth edition.

Note: The insertion of new lenses is included in lens extraction procedures.

Source: AIHW National Hospital Morbidity Database.

There was an average of 2.4 procedures per eye disease and disorder episode.

The vast majority (99%) of separations for eye diseases and disorders involved discharge to the patient's usual residence or welfare institution (Table A2.6). After this, the most common mode of separation was a transfer to an acute hospital, although this only occurred for around 1,800 separations (less than 1% of total separations).

Regional variation in hospitalisation

States and territories

There was some variation for eye diseases and disorders separation rates among the states and territories. Queensland had higher rates than the other jurisdictions, while the lowest rates were seen in Tasmania and the Australian Capital Territory (Figure 2, Table A2.3). This is true even after adjusting for the effect of different age structures of the states and territories.

Separations per 100,000 population

Notes

1. Directly age-standardised to the 2001 Australian population.

2. Excludes 2,657 separations where state/territory was unknown or not applicable.

3. Separations are counted by state of residence (regardless of the state of hospitalisation), and the denominator used is the state-specific population.

Figure 2: Hospital separations for eye diseases and disorders, by state/territory of usual residence of patient, 2005–06

The overall state and territory pattern reflects the separation rate for cataract diagnoses (other cataract and senile cataract), as these accounted for the largest number of separations. Queensland had the highest age-adjusted separation rate for cataract diagnoses, while Tasmania had the lowest. However, the pattern shown in Figure 2 did not apply for all diagnoses. For example, the separation rate for disorders of refraction and accommodation in South Australia was 4 times as high as the national average.

Remoteness

The Australian Standard Geographical Classification (ASGC) Remoteness Area categories were used to classify the remoteness of patients' area of usual residence. This classification is based on how far certain areas are, by road, from urban centres of various sizes. It is therefore an approximation of how accessible essential services are for residents of a particular area. There are five categories in the classification: Major Cities, Inner Regional, Outer Regional, Remote and Very Remote. It is estimated that in 2006 the majority (68%) of the population lived in Major Cities, while 2% and 1% lived in Remote and Very Remote areas, respectively.

There was no clear gradient of separation rates by remoteness category. Separation rates tended to rise with increasing remoteness for the three least remote areas, with

the highest rates in Outer Regional. However, separation rates dropped off markedly for the two remote areas (Figure 3). The rate of separations in the Remote area was significantly lower than rates in any of the three least remote areas (Table A2.4).

Separations per 100,000 population

Notes

1. Directly age-standardised to the 2001 Australian population.

2. Excludes 2,305 separations where remoteness category was unknown or not applicable.

Figure 3: Hospital separations for eye diseases and disorders by remoteness category, 2005–06
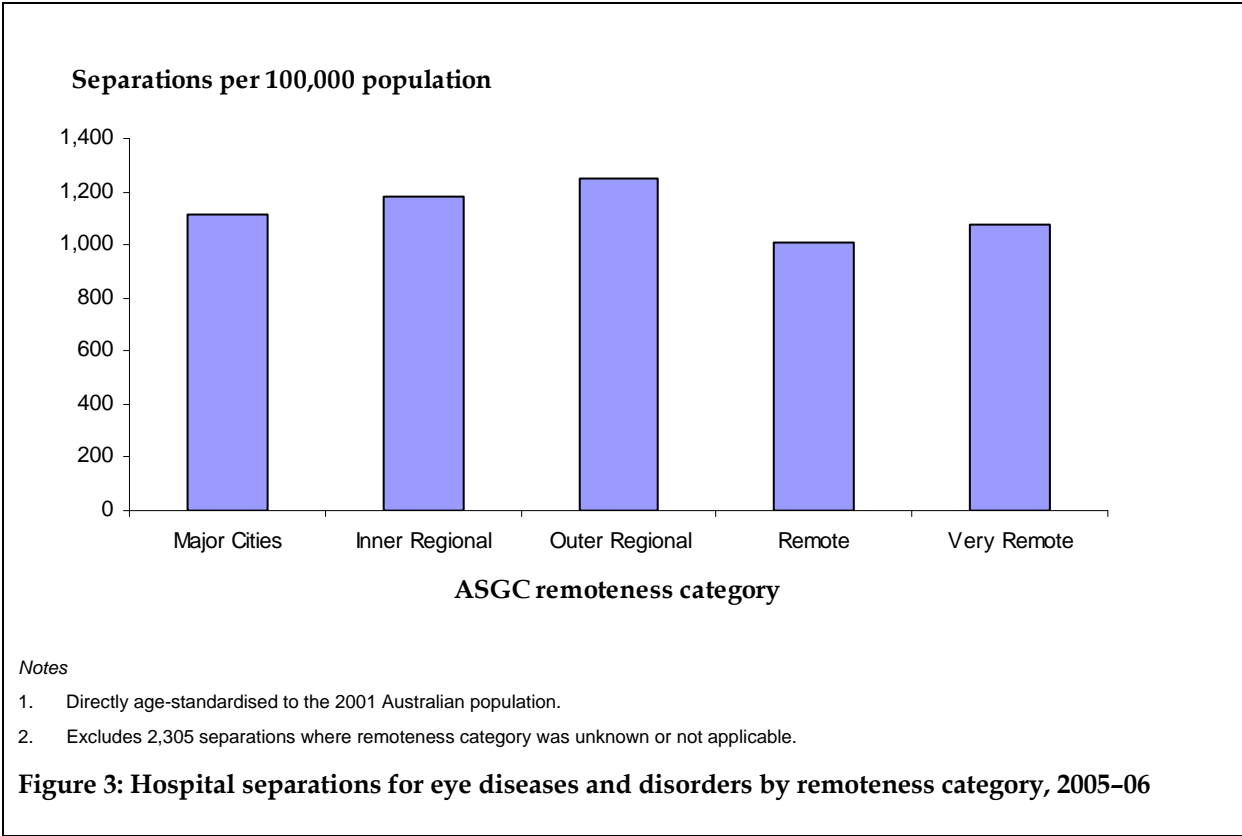
As with the states and territories, overall separation rates by remoteness tended to reflect cataract separations. These were highest in Outer Regional areas, and lowest in Remote and Very Remote areas. Diagnoses with a variation in this pattern included separations for external causes (including injuries to the head), where separation rates were significantly higher in Remote and Very Remote areas than in other areas. Similarly, separation rates for conjunctivitis were significantly higher in Remote and Very Remote areas.

Eye diseases and disorders hospital separations among Aboriginal and Torres Strait Islander peoples

Due to data quality issues, analysis of eye diseases and disorders separations by Indigenous status excludes hospital data from Tasmania and the Australian Capital Territory. These jurisdictions have very small Indigenous populations and would have a minimal impact on the national statistics. Care should be exercised when interpreting the statistics presented, as under-identification remains an issue (AIHW 2005b).

Tables 6 and 7 use standardised separation ratios to compare eye diseases and disorders among Indigenous Australians with all Australians. The rate among Aboriginal and Torres Strait Islander peoples was 1% higher than the Australian rate (Table 6).

Table 6: Hospital separations for eye diseases and disorders among Aboriginal and Torres Strait Islander peoples, 2005–06

Sex	Number of separations	Standardised separation ratio[a]	95% confidence interval
Males	969	1.02	0.95–1.08
Females	1,088	1.00	0.94–1.07
Persons	2,057	1.01	0.97–1.06

(a)   The standardised separation ratio is the ratio of the observed number of separations to the number of expected separations, if the rates for all Australians are applied.

Note: Data are for hospitalisations in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory (public hospitals only). These are the jurisdictions with the most complete Indigenous identification in hospital, but significant under-identification remains. These numbers underestimate the actual Indigenous separations for eye diseases and disorders.

Source: AIHW National Hospital Morbidity Database.

There was, however, considerable variation when hospital separations for eye diseases and disorders were analysed by principal diagnosis (Table 7). Cataract was the leading principal diagnosis for Aboriginal and Torres Strait Islander peoples, but the rate of separation was only two-thirds of the Australian rate. Eye-related injuries to the head had a separation rate more than 3 times the rate compared with all Australians, and separations for diabetes-related eye disorders had a ratio of 2.4 when compared with the Australian rate.

Table 7: Hospital separations for eye diseases and disorders, for selected principal diagnoses, among Aboriginal and Torres Strait Islander peoples, 2005–06

Principal diagnosis	Number of separations	Standardised separation ratio[a]	95% Confidence interval
Cataract (H25, H26)	519	0.65	0.59–0.70
Diabetes (E10-E14)	371	2.42	2.17–2.67
Injuries to the head (S00-S09)	389	3.46	3.11–3.80

(a)   The standardised separation ratio is the ratio of the observed number of separations to the number of expected separations, if the rates for all Australians are applied.

Note: Data are for hospitalisations in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory only. These are the jurisdictions with the most complete Indigenous identification in hospital, but significant under-identification remains. These numbers underestimate the actual Indigenous separations for eye diseases and disorders.

Source: AIHW National Hospital Morbidity Database.

Hospital-related costs for eye diseases and disorders

This analysis details only public hospitals costs, as the cost weights for AR-DRG version 5.0 for the private sector are not yet available. Cost weights (the relative cost for a given separation) for public and private hospitals are very different and cannot be interchanged. Previous years' data suggest that the total cost in 2005–06 for private hospitals for all DRGs for eye diseases and disorders is approximately $220 million.

The public sector cost was dominated by lens procedures, particularly same-day procedures. These procedures are relatively inexpensive but as they contributed 61% of all separations for eye-related DRGs, they made up about half of the total public sector cost (Table 8). Other important contributors were retinal procedures (9% of total costs) and eyelid procedures (5%).

There was some variation in the mix of DRG groupings carried out in the two hospital sectors (Table 8). Sixty-eight per cent of all surgical procedures for eye diseases and disorders were performed in private hospitals, but only 15% of all medical procedures. Variation also occurred in individual procedures, for example the average length of stay for procedures for penetrating eye injury in public hospitals was 5 days, compared with 1.4 days in private hospitals.

Table 8: AR-DRGs for eye diseases and disorders, public hospitals, 2005–06

		Public hospitals			Private hospitals	
AR-DRG[a] descriptions		Separations	ALOS (days)	Cost by volume ($'000)[b]	Separations	ALOS (days)
Surgical procedures						
C16B	Lens procedures, same-day	50,373	1.0	115,697	111,124	1.0
C03Z	Retinal procedures	4,885	1.6	21,505	7,677	1.1
C11Z	Eyelid procedures	4,118	1.2	11,665	11,007	1.0
C16A	Lens procedures (not same-day)	2,647	1.4	9,930	8,080	1.1
C14Z	Other eye procedures	3,338	1.5	8,050	6,179	1.0
C12Z	Other corneal, scleral and conjunctival procedures	2,542	1.4	7,298	5,702	1.0
C10Z	Strabismus procedures	1,758	1.0	5,316	1,619	1.0
C15B	Glaucoma and complex cataract procedures, same-day	1,662	1.0	4,708	2,147	1.0
C02Z	Enucleations and orbital procedures	588	3.3	4,547	399	1.6
C01Z	Procedures for penetrating eye injury	487	5.0	4,400	129	1.4
C04Z	Major corneal, scleral and conjunctival procedures	662	4.1	3,953	2,813	1.0
C15A	Glaucoma and complex cataract procedures	773	2.4	3,876	360	1.5
C05Z	Dacryocystorhinostomy	913	1.2	3,495	1,546	1.1
C13Z	Glaucoma and complex cataract procedures, same-day	675	1.2	1,369	927	1.0
Medical procedures						
C62Z	Hyphema and medically managed trauma to the eye	4,072	1.8	7,794	210	4.1
C63B	Other disorders of the eye, without cc[c]	3,567	1.7	6,145	1,152	1.5
C60A	Acute and major eye infections age > 54	533	6.8	3,897	115	8.1
C61Z	Neurological and vascular disorders of the eye	1,418	2.4	3,800	211	2.8
C63A	Other disorders of the eye, with cc[c]	835	3.9	3,228	141	5.1
C60B	Acute and major eye infections age < 55	519	3.6	2,086	41	3.6
All AR-DRGs for eye diseases and disorders		**86,365**	**1.3**	**232,759**	**161,579**	**1.0**

(a)   Version 5.0.

(b)   Based on the 2005–06 AR-DRG version 5.0 cost weights.

(c)   Comorbidity and/or complications.

Source: AIHW National Hospital Morbidity Database and 2005–06 AR-DRG version 5.0 cost weights (DoHA 2007).

Waiting times for ophthalmology

The National Elective Surgery Waiting Times Data Collection comprises information about people who require a surgical procedure in a public hospital setting where the clinician has deemed their condition warrants elective as opposed to emergency attention. Waiting times are determined by clinical assessment of the patient. Once on the waiting list, a patient is assigned a clinical urgency category, based on the degree of pain, disability and potential for deterioration of the condition. Clinical urgency indicates the length of time that a patient could appropriately wait for the surgical procedure. Clinical urgency is classified as requiring surgery within 30 days, 90 days or some other time in the future.

In this section, waiting times are summarised for patients who have been removed from the waiting list to undergo the surgical procedure they were waiting for.

For ophthalmology surgery, the median waiting time increased, on average, by 3 days per year between 2001–02 and 2005–06. For all surgical specialties combined, the average annual increase in median days waited for surgery during the same period was 1 day per year.
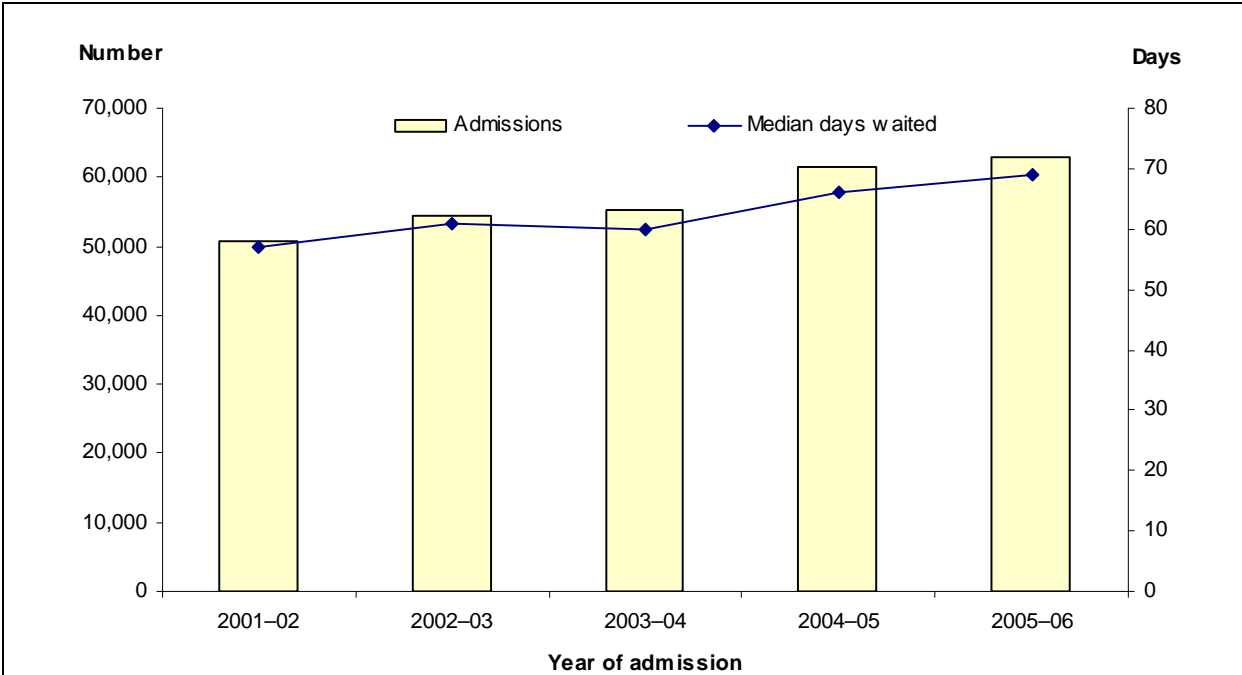
Source: AIHW National Elective Surgery Waiting Times Data Collection.

Figure 4: Number of admissions from elective surgery waiting lists and median days waited, for ophthalmology, 2001-02 to 2005-06, all hospitals

In 2005–06, there were nearly 63,000 admissions for elective surgery for ophthalmology compared with around 51,000 in 2001–02 (Figure 4). This equates to an average annual increase of about 3,000 admissions. Of all hospital admissions

arising from the waiting list during 2005–06, 11.3% were for those waiting for surgery by a specialist in ophthalmology. The median waiting time for ophthalmology was 69 days, the longest of any speciality (Figure 5). Around 90% of ophthalmology admissions occurred within 326 days, and 6.5% had waited for more than 1 year.
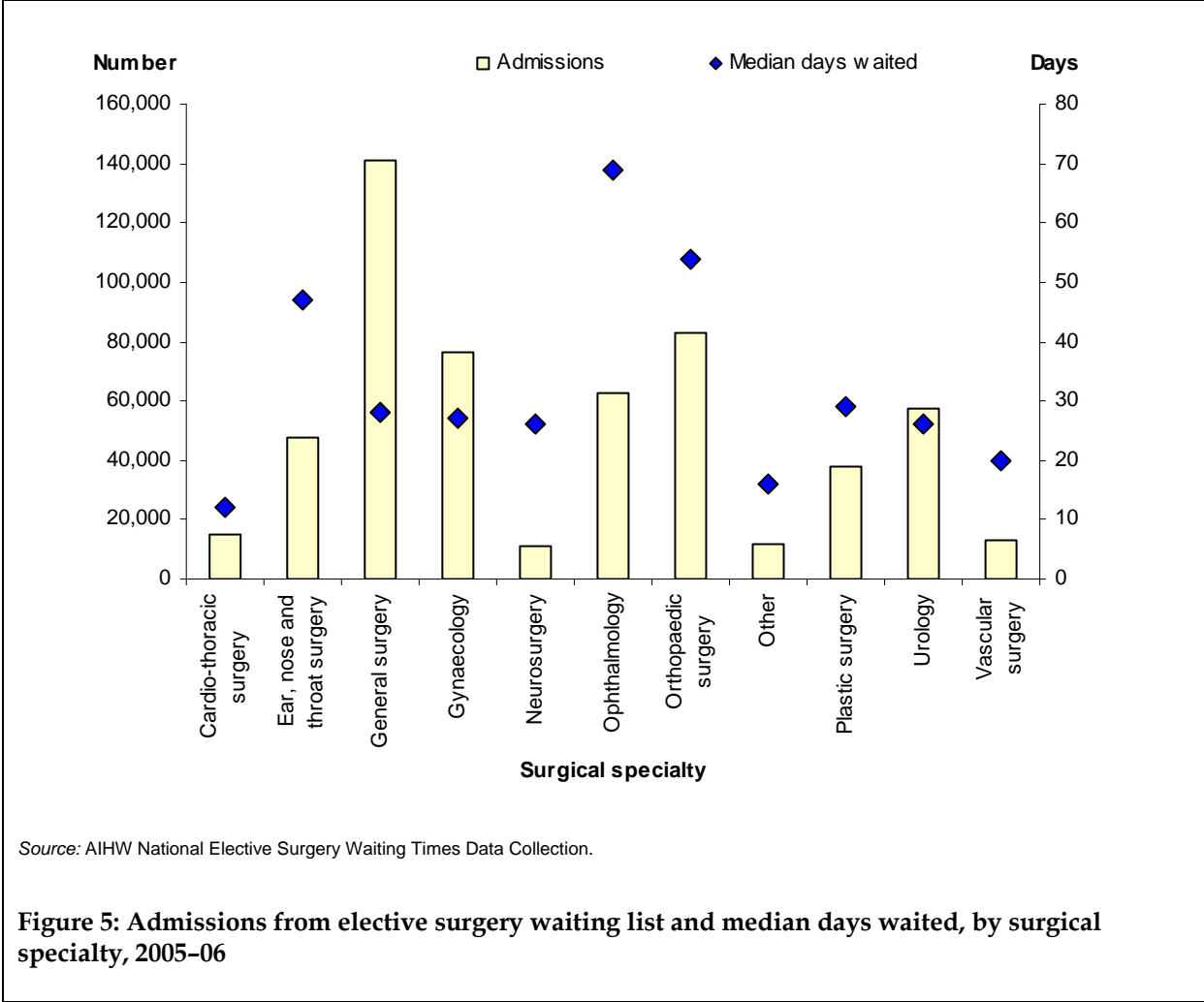

Source: AIHW National Elective Surgery Waiting Times Data Collection.

Figure 5: Admissions from elective surgery waiting list and median days waited, by surgical specialty, 2005–06

The majority of people waiting for surgery in ophthalmology were waiting for a cataract extraction (73.1% of all cases). Of the admissions from the waiting list for ophthalmology (excluding hospitals in Tasmania and Victoria), the most common principal diagnosis during 2005–06 was other cataract (54.9%) and Type 2 diabetes mellitus (12.8%).

The average length of stay for admissions for ophthalmology from the elective surgery waiting list was 1.1 days, suggesting mainly same-day separations.

There was great variation in median waiting times for ophthalmology among the states and territories (Table 9). The longest median waiting time for 2005–06 was 189 days in the Northern Territory. The Australian Capital Territory and New South Wales also had median waiting times much higher than the national median of 69 days. The shortest median waiting time over the same period was 34 days in

Queensland. The proportion of people waiting more than 1 year for ophthalmology surgery also varied among state and territories, from 1% in Victoria to 30% in Tasmania.

Table 9: Median waiting time and proportion waiting more than 1 year, ophthalmology, 2005–06

Measure	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Median waiting time (days)	132	38	34	71	68	41	180	189	69
Waiting more than 1 year (per cent)	9.4	1.0	3.8	6.0	4.2	30.2	22.5	19.1	6.5

Source: AIHW National Elective Surgery Waiting Times Data Collection.

It is difficult to assess system performance in ophthalmology (or any other specialty) without reference to clinical urgency and overdue patient status. Although data are collected for clinical urgency (and derived for overdue patient status), the data are deemed to be of poor quality due to inconsistency in collection. As a result, comparison of waiting times between surgical specialties should be interpreted with care.

Appendix 1: Methods and data sources

The statistics presented in this report were extracted from the National Hospital Morbidity Database and the National Elective Surgery Waiting Times Data Collection. Both these databases are maintained by the Australian Institute of Health and Welfare (AIHW) and are compilations of records from data collection systems in Australian hospitals.

There are some important points to note when interpreting hospital data. The information presented in this report refers to hospital separations, not patients. A separation is an episode of care, which can be a whole hospital stay, or part of a hospital stay ending in a change of type of care. The same patient can have multiple separations within the same year and indeed within the same hospitalisation period. Therefore, individual patients may be represented by more than one separation. For these reasons, the data do not represent the number or proportion of people in Australia with eye conditions admitted to hospital.

National Hospital Morbidity Database

The National Hospital Morbidity Database contains demographic, diagnostic, procedural and duration of stay information on episodes of care for patients admitted to hospital. The data items are supplied by state and territory health authorities to the AIHW for storage and custodianship. The database provides information on the number of hospitalisations, so it is not possible to count patients individually.

AR-DRGs

This report uses the AR-DRG approach to define separations and procedures related to diseases and disorders of the eye. AR-DRGs are a means of classifying episodes into diagnostically meaningful groups of episodes that have similar costs. The obvious benefit of this is that we can sensibly analyse costs but also confidently define the boundaries of diseases and disorders of the eye in hospital data.

An alternative approach, analysing all procedures on eye and adnexa, would have resulted in approximately 259,000 separations in 2005–06. This is statistically very similar to the 247,944 separations in 2005–06 analysed in this report. Restricting the analysis to separations with a principal diagnosis for diseases of the eye and adnexa (approximately 206,000 separations) would be too restrictive and omit many diabetes, cancer and injury-related eye problems. Capturing all separations where there was an eye and adnexa diagnosis in 2005–06 (approximately 309,000 separations) was considered too broad a definition, and would include separations where the eye problem did not warrant hospitalisation and/or was not treated.

Care type

All data for this report had a care type of 1 (acute care), 7.1 (newborn—qualified days only), 7.2 (newborn—qualified and unqualified days) and 11 (unknown and not reported). This is standard for analysis by DRGs. Consequently, eye-related separations for patients receiving palliative, rehabilitation, psychogeriatric or maintenance care are excluded. These last categories, however, contribute less than 0.2% of all eye separations.

Aboriginal and Torres Strait Islander peoples

Analysis for Aboriginal and Torres Strait Islander peoples was restricted to New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory, due to data quality issues for the remaining jurisdictions. Northern Territory data was restricted to public hospitals only.

Remoteness

Remoteness was categorised using the Australian Standard Geographical Classification (ASGC) Remoteness Area categories. The ASGC uses the Accessibility/Remoteness Index of Australia, which is based on how distant a place is by road from urban centres of different sizes, and therefore provides a relative indication of how difficult it might be for residents to access certain services such as health care and education.

The categories used in this report are 'Major Cities of Australia', 'Inner Regional Australia', 'Outer Regional Australia', 'Remote Australia' and 'Very Remote Australia'. A total of 2,305 separations were excluded from the analysis as they were not assigned a remoteness area due to missing or invalid data or being non-Australian residents.

State/territory

Data by state/territory were based on usual residence of the patient, rather than location of the hospital. Records where state/territory was unknown or not recorded (2,657 separations) were excluded from the state/territory analysis in this report.

Hospital-related costs for eye diseases and disorders

The cost by volume for private hospitals in 2005–06 was estimated by comparing the ratio of separations and costs between the public and private sectors for the years 2002–03 and 2003–04. The cost ratio for these years was applied to 2005–06 separation data.

National Elective Surgery Waiting Times

The National Elective Surgery Waiting Times Data Collection comprises people admitted for elective surgery in public acute care hospitals where the admission urgency status was coded to elective. The data set includes information about the

surgical specialty and indicator procedure that is being waited for. All states and territories contribute data to the waiting list, but coverage varied from 100% in Queensland to 66.6% in the Northern Territory.

The summary on waiting time for ophthalmology covers admissions (and separations) for people on the waiting list who were waiting for surgery by a doctor who specialise in ophthalmology. Patients who were 'not ready for care' (that is, those who are unavailable for personal or work reasons or who need another procedure before the procedure for which they are waiting) are excluded from analyses on waiting time. Patients waiting for argon laser phototherapy are not included in the surgical specialty for ophthalmology.

Estimated resident population

Australian Bureau of Statistics estimated resident population data were used in the calculation of rates. Where possible, the December estimated resident population for the relevant financial year was used (for example December 2005 for use with 2005–06 hospital data).

Aboriginal and Torres Strait Islander peoples

The Indigenous estimated resident population is considered to be experimental because satisfactory data on births, deaths and migration are not generally available, and because of the volatility of counts of the Indigenous population between censuses (ABS 2004). Analysis for the population data for Aboriginal and Torres Strait Islander peoples was limited to New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory due to data quality issues in the remaining jurisdictions in the National Hospital Morbidity Database. The average of the June 2005 and June 2006 populations were used.

Urban, rural and remote areas

Remoteness was categorised using the ASGC remoteness categories described above. The average of the June 2005 and June 2006 populations were used.

Age standardisation

Age-standardised rates were used to remove the influence of age when comparing populations with different age structures. There are two methods used for age standardising: direct and indirect.

Direct age standardisation

Direct age standardisation is used when the populations under study are large and the age-specific rates are considered to be reliable.

The calculation of direct age-standardised rates comprises three steps:

1. Calculate the age-specific rate for each age group in the study population.

2. Calculate the expected number of cases in each age group by multiplying the age-specific rate by the corresponding standard population for each age group.

3. Sum the expected number of cases in each age group and divide by the total standard population to give the age-standardised rate.

The 2001 Australian population was used as the standard population for this report.

Indirect age standardisation

Indirect age standardisation is used when populations under study are small or where there is some uncertainty about the stability of age-specific rates. The method removes the influence of age structure, but does not provide a measure of prevalence in terms of a rate. Rather, the measure is a comparison of the number of observed cases compared with the number expected if the age-specific prevalence rates of the standard population are applied to the study population.

The calculation of direct age-standardised rates comprises three steps:

1. Calculate the age-specific rates for each age group in the standard population.

2. Calculate the expected number of cases in each age group by multiplying the age-specific rates by the corresponding study population for each age group. Sum these to derive the total expected number of cases for the study population.

3. Sum the observed number of cases in the study population and divide by the total expected cases to give the standardised separation ratio.

A standardised separation ratio of 1 indicates that the number of observed cases was the same as the expected number of cases, indicating that rates in the study and standard populations are similar. A result greater than 1 indicates that more cases were observed than expected, and a result less than 1 indicates fewer cases than expected.

In this report, indirect age standardisation was used for comparing separation rates between Indigenous and non-Indigenous Australians. The standard population used were all Australians.

Appendix 2: Statistical tables

Table A2.1: Hospital separations for eye diseases and disorders by age group and sex, 2005–06

Age group (years)	Number of separations			Separations per 100,000 population		
	Males	Females	Persons	Males	Females	Persons
0–4	2,515	2,245	4,760	376.4	354.7	365.8
5–9	1,282	1,019	2,301	186.7	156.2	171.8
10–14	747	672	1,419	103.9	98.6	101.3
15–19	904	615	1,519	125.8	90.1	108.4
20–24	1,133	826	1,959	153.7	116.3	135.4
25–29	1,188	1,028	2,216	169.2	148.3	158.8
30–34	1,507	1,373	2,880	200.9	181.0	190.9
35–39	1,723	1,606	3,329	229.6	211.8	220.7
40–44	2,408	2,073	4,481	314.5	267.4	290.8
45–49	3,096	3,004	6,100	420.9	402.1	411.4
50–54	4,435	4,665	9,100	658.6	687.0	672.8
55–59	7,200	7,103	14,303	1,142.5	1,134.6	1,138.6
60–64	8,800	9,679	18,479	1,813.7	2,013.3	1,913.1
65–69	12,198	14,578	26,776	3,203.6	3,743.2	3,476.4
70–74	15,987	21,238	37,225	5,305.8	6,523.7	5,938.3
75–79	20,688	28,706	49,394	8,253.9	9,589.2	8,980.7
80–84	16,717	23,923	40,640	10,291.0	10,093.9	10,174.0
85+	8,065	12,998	21,063	8,026.4	6,138.3	6,745.9
All ages	**110,593**	**137,351**	**247,944**	**1,082.3**	**1,328.2**	**1,206.0**
Age-standardised rate				**1,135.5**	**1,192.9**	**1,161.8**

Note: Directly age-standardised to the 2001 Australian population.

Source: AIHW National Hospital Morbidity Database.

Table A2.2: Trends in hospital separations for eye diseases and disorders, 2001–02 to 2005–06

Years	Number of separations			Separations per 100,000 population		
	Males	Females	Persons	Males	Females	Persons
2001–02	91,789	114,301	206,090	1,042.6	1,062.4	1,050.7
2002–03	96,386	121,564	217,950	1,069.7	1,109.4	1,088.1
2003–04	99,820	123,417	223,237	1,080.6	1,107.6	1,091.3
2004–05	106,581	132,726	239,307	1,125.5	1,172.7	1,146.3
2005–06	110,593	137,351	247,944	1,135.5	1,192.9	1,161.8

Note: Directly age-standardised to the 2001 Australian population.

Source: AIHW National Hospital Morbidity Database.

Table A2.3: Hospital separations for eye diseases and disorders by state/territory of usual residence, 2005–06

State/territory	Males	Females	Persons
	Separations per 100,000 population (95% confidence interval)		
New South Wales	1,173.3 (1,161.6–1,185.2)	1,227.5 (1,216.5–1,238.6)	1,197.6 (1,189.6–1,205.6)
Victoria	1,014.9 (1,002.2–1,027.1)	1,106.7 (1,094.5–1,118.9)	1,059.7 (1,051.0–1,068.4)
Queensland	1,274.6 (1,258.3–1,291.1)	1,266.9 (1,251.6–1,282.4)	1,267.1 (1,256.1–1,278.3)
Western Australia	1,136.9 (1,114.9–1,159.4)	1,219.4 (1,198.1–1,241.0)	1,175.6 (1,160.3–1,190.9)
South Australia	1,004.8 (983.0–1,026.9)	1,089.0 (1,068.0–1,110.2)	1,046.3 (1,031.3–1,061.4)
Tasmania	869.7 (833.0–907.5)	943.0 (908.1–978.8)	904.0 (879.0–929.6)
Australian Capital Territory	843.2 (791.1–897.8)	1,002.8 (951.5–1,056.2)	924.2 (887.8–961.6)
Northern Territory	1,179.4 (1,074.1–1,290.7)	1,099.5 (1,000.9–1,204.1)	1,138.5 (1,067.1–1,212.7)

Notes

1. Excludes 2,657 separations where state/territory was unknown or not applicable.

2. Directly age-standardised to the 2001 Australian population.

3. Separations by state of residence (regardless of the state of hospitalisation), and the denominator used is the state specific population.

Source: AIHW National Hospital Morbidity Database.

Table A2.4: Hospital separations for eye diseases and disorders by remoteness, 2005–06

Remoteness Area	Males	Females	Persons
	Separations per 100,000 population (95% confidence interval)		
Major Cities	1,078.0 (1,069.8–1,086.1)	1,159.6 (1,151.9–1,167.3)	1,117.5 (1,111.9–1,123.0)
Inner Regional	1,169.0 (1,154.7–1,183.4)	1,205.1 (1,191.6–1,218.7)	1,184.8 (1,175.1–1,194.6)
Outer Regional	1,259.8 (1,238.2–1,281.8)	1,250.5 (1,229.7–1,271.6)	1,251.6 (1,236.7–1,266.7)
Remote	1,038.8 (984.3–1,095.5)	967.2 (913.7–1,023.0)	1,004.9 (966.8–1,044.1)
Very Remote	1,124.7 (1,039.4–1,214.7)	1,029.4 (942.7–1,121.6)	1,079.3 (1,018.4–1,142.8)

Notes

1. Excludes 2,305 separations where remoteness was unknown or not applicable.

2. Directly age-standardised to the 2001 Australian population.

Source: AIHW National Hospital Morbidity Database.

Table A2.5: Hospital separations for eye diseases and disorders by surgical/medical partition, age group and sex, 2005–06

Age group (years)	Surgical			Medical		
	Males	**Females**	**Persons**	**Males**	**Females**	**Persons**
0–4	1,704	1,557	3,261	811	688	1,499
5–9	836	786	1,622	446	233	679
10–14	453	475	928	294	197	491
15–19	515	410	925	389	205	594
20–24	705	591	1,296	428	235	663
25–29	823	776	1,599	365	252	617
30–34	1,101	1,117	2,218	406	256	662
35–39	1,357	1,359	2,716	366	247	613
40–44	2,008	1,813	3,821	400	260	660
45–49	2,760	2,769	5,529	336	235	571
50–54	4,130	4,422	8,552	305	243	548
55–59	6,893	6,818	13,711	307	285	592
60–64	8,481	9,408	17,889	319	271	590
65–69	11,840	14,290	26,130	358	288	646
70–74	15,585	20,871	36,456	402	367	769
75–79	20,258	28,228	48,486	430	478	908
80–84	16,334	23,387	39,721	383	536	919
85+	7,818	12,452	20,270	247	546	793
All ages	**103,601**	**131,529**	**235,130**	**6,992**	**5,822**	**12,814**

Source: AIHW National Hospital Morbidity Database.

Table A2.6: Separation modes for eye diseases and disorders, 2005–06

Separation mode	Number
Discharge/transfer to an(other) acute hospital	1,799
Discharge/transfer to a residential aged care service, unless this is the usual place of residence	294
Discharge/transfer to an(other) psychiatric hospital	10
Discharge/transfer to other health care accommodation (includes Mothercraft hospitals)	112
Statistical discharge/type change	140
Left against medical advice/discharge at own risk	294
Statistical discharge from leave	31
Died	35
Other (includes discharge to usual residence/own accommodation/welfare institution (includes prisons, hostels and group homes providing primarily welfare services)	245,234
Unknown	5
Total	**247,944**

Source: AIHW National Hospital Morbidity Database.

Glossary

Adnexa Appendages of an organ.

Age standardisation A method of removing the influence of age when comparing populations with different age structures. This is usually necessary because the rates of many separations vary strongly (usually increasing) with age. The age structures of the different populations are converted to the same standard structure, then the separation rates that would have occurred with that structure are calculated and compared.

Average length of stay (ALOS) The average of the length of stay for admitted patient episodes, usually expressed in days.

Complications A secondary problem resulting directly or indirectly from a disease or condition that worsens the patient's condition and makes treatment more complicated.

Complication and/or comorbidity (CC) CC codes are diagnoses likely to result in significantly greater resource consumption.

Confidence interval A statistical term describing a range (interval) of values within which we can be 'confident' that the true value lies, usually because it has 95% or higher chance of doing so.

Conjunctiva A clear membrane that covers the sclera (white part of the eye) and lines the inside of the eyelids.

Cornea The transparent front part of the eye that covers the iris, pupil, and anterior chamber.

Cost weights The costliness of an AR-DRG, relative to all other AR-DRGs such that the average cost weight for all separations is 1.00. A separation for an AR-DRG with a cost weight of 5.0, therefore, on average, costs 10 times as much as a separation with a cost weight of 0.5. There are separate cost weights for AR-DRGs in the public and private sectors, reflecting the differences in the range of costs in the different sectors. In this report, average cost weights using public cost weights are based on AR-DRG version 5.0 2004–05 public sector estimated cost weights (DoHA 2006).

Dacryocystorhinostomy A surgical procedure to restore the flow of tears into the nose from the lacrimal sac when the nasolacrimal duct does not function.

Diagnosis Related Group (DRG) A patient classification scheme that provides a clinically meaningful way of relating the types of patients treated in a hospital to the resources required by the hospital.

Ectropion The medical condition in which the lower eyelid turns outwards.

Entropion The medical condition in which the eyelids fold inward.

Glaucoma A group of diseases of the optic nerve involving loss of retinal ganglion cells in a characteristic pattern of optic neuropathy.

Hospital separation The formal process by which a hospital records the completion of treatment and/or care for an admitted patient. The episode of care may be completed by an admitted patient's discharge, death, transfer to another hospital, or change in the type of care.

ICD-10 A classification system in the WHO Family of International Classifications. It is the international standard diagnostic classification for all general epidemiological and many health management purposes. It is used to classify diseases and other health problems recorded on many types of health and vital records, including death certificates and hospital records.

ICD-10-AM The Australian modification of the international standard ICD-10. It consists of a tabular list of diseases and accompanying index, a tabular list and index of procedures and Australian Coding Standards for the selection of codes. The ICD-10-AM disease component is based on the WHO ICD-10. It uses an alphanumeric coding scheme for diseases. It is structured by body system and aetiology. The ICD-10-AM procedures component is based on the Medicare Benefits Schedule. The classification is structured by body system, site and procedure type. Procedures not currently listed in Medicare Benefits Schedule have also been included (for example, allied health interventions, cosmetic surgery).

Indigenous A person of Aboriginal and/or Torres Strait Islander descent who identifies as an Aboriginal and/or Torres Strait Islander and is accepted as such by the community with which he or she is associated.

Keratomileusis A surgical improvement of the refractive state of the cornea performed by lifting up the front surface of the eye by forming a thin hinged flap under which the shape of the cornea is changed by using an excimer laser or other surgical device.

Lacrimal system Tear ducts and connected structures.

Laser-assisted in situ keratomileusis (LASIK) A type of refractive laser eye surgery which reshapes the cornea. It is usually performed in order to treat short-sightedness, although it is also used to treat other eye disorders such as astigmatism. ICD-10-AM procedure code 42671-01 is used in this publication to define the procedure.

Length of stay (LOS) Duration of hospital stay, calculated by subtracting the date the patient is admitted from the day of separation. All leave days, including the day the patient went on leave, are excluded. A same-day patient is allocated a length of stay of 1 day.

Low vision A visual impairment which cannot be corrected by glasses or contact lenses, and which affects the ability to perform everyday activities.

Major Diagnostic Categories (MDCs) A high level of groupings of patients used in the AR-DRG classification. MDCs are generally based on a single body system or aetiology that is associated with a particular medical speciality.

Malignant neoplasm (Cancer) A class of diseases in which a group of cells display the traits of uncontrolled growth.

Medicare Benefits Schedule (MBS) A listing of the Medicare services subsidised by the Australian Government.

Non-operating room (NonOR) procedures Procedures considered significant by the classification for some MDCs. However, it is to be noted that procedures identified as NonOR for purposes of AR-DRG classification may take place in operating rooms. If a NonOR procedure is not significant in an MDC, the patient's episode of care will be assigned to a medical DRG.

Operating room (OR) procedures Procedures considered significant throughout the AR-DRG classification. If an OR procedure is not significant in the MDC that the episode is assigned to, it will be grouped to one of the error DGRs 901Z, 902Z and 903Z.

Orbit Bony cavity containing the eye and its muscles, glands and associated structures.

Phacoemulsification A procedure for removal of the crystalline lens in cataract surgery in which an anterior capsulectomy is performed by means of a needle inserted through a small incision at the temporal limbus, allowing the lens contents to fall through the dilated pupil into the anterior chamber where they are broken up by the use of ultrasound and aspirated out of the eye through the incision. The small incision allows the surgeon to use very few or even no stitches to close the tiny wound. There is usually no need for hospitalisation and patients may resume most activities within days.

Photorefractive keratoplasty (PRK) A type of refractive laser eye surgery in which the outer layer of the cornea is removed to decrease dependence on glasses or contact lenses. ICD-10-AM procedure code 90063-00 is used in this publication to define the procedure.

Principal diagnosis The diagnosis describing the problem that was chiefly responsible for the patient's episode of care in hospital (or attendance at the health care facility).

Private hospital A privately owned and operated institution, catering for patients who are treated by a doctor of their own choice. Patients are charged fees for accommodation and other services provided by the hospital and relevant medical and allied health practitioners. The term includes private free-standing day hospital facilities.

Public hospital A hospital controlled by a state or territory health authority. In Australia, public hospitals offer free diagnostic services, treatment, care and accommodation to all who need it.

Retinal A light-sensitive retinene molecule found in the photoreceptor cells of the retina.

Separation An episode of care in a hospital. This can refer to either the total stay (from admission to discharge, transfer, or death) or a portion of the total stay that ends in a change in the type of care (for example, moving from acute care to rehabilitation).

Surgical, other and medical partitions MDCs are sub-divided into one of these partitions. The presence or absence of OR and NonOR procedures is generally responsible for the assignment of a record to one or another of these partitions.

Vitrectomy A surgery to remove some or all of the vitreous humour from the eye.

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